Press Release Belgium / Estonia, 8 February 2021

SESAR JU kicks off urban air mobility research project GOF 2.0

With the further enhancement of unmanned aerial vehicles (UAVs) and air taxis in the rapidly growing drone market comes the need for the evolution of technologies and framework conditions for their safe coexistence with manned aircraft. The SESAR JU project "GOF 2.0 Integrated Urban Airspace Validation", with a consortium of 13 members, will focus on the safe, secure, and sustainable integration of unmanned aerial vehicle and air taxi operations in urban airspace and kicked-off at the end of January.

The follow-up to the SESAR JU Gulf of Finland (GOF) U-space project, which successfully demonstrated the safe airspace integration of unmanned aerial vehicles in summer 2019, will go a step further and test unmanned aerial vehicle flights specifically in urban airspace over the next two years.

The integration of unmanned traffic management (UTM) into air traffic management (ATM) systems was already the focus of the SESAR JU research project GOF U-space, which successfully tested U-space services in seven advanced live trials with 11 unmanned and manned aircraft operators. The trials, both in controlled and uncontrolled airspace, and below as well as above 500 feet in urban, rural, and maritime environments, demonstrated that an integrated environment where manned and unmanned aviation share the same data will improve situational awareness and safety.

The work leading up to the advanced flight trials highlighted the importance of building a scalable U-space architecture and ensured that the technical environment relies on international standards using system wide information management (SWIM) principles. The GOF U-space project also underlined the fact that it is equally important to ensure that the market is interoperable and open, with authority oversight to enable easy sharing of safety-related information.

Building on the key learnings and results of this project, SESAR JU GOF 2.0 now intends to safely, securely, and sustainably demonstrate operational validity of serving combined unmanned aerial systems (UAS), electric vertical takeoff and landing (eVTOL), and manned operations in a unified, dense urban airspace using existing ATM and U-space services and systems. Both ATM and U-space communities depend extensively on the provision of timely, relevant, accurate, and quality-assured digital information to collaborate and make informed decisions. The demonstrations will focus on the validation of the GOF 2.0 architecture for highly automated real-time separation assurance in dense airspace, including precision weather and telecom networks for air-ground communication. This will significantly contribute to understanding how the safe integration of UTM and other commercial drone

operations into ATM airspace can be implemented without degrading safety, security, or disrupting current airspace operations.

GOF 2.0 is an important enabler for the further development of the drone market and will deliver the technical components (services, software, competencies, practices) required to cost-efficiently operate autonomous and semi-autonomous drones beyond visual line of sight (BVLOS) in the shared airspace. This is made possible by repurposing already available ATM commercial off-the-shelf components and integrating the latest U-space technology. Furthermore, it will nurture acceptance of drones as part of the new mobility mix, including Air Navigation Service Providers (ANSPs), all airspace users, regulatory authorities, and ultimately the flying public.

The GOF 2.0 consortium, consisting of 13 scientific and commercial partners from the drone and aviation industry, will use its expertise and technology to ensure safe flight operations in all classes of airspace in order to provide all airspace users with fair and efficient access to the shared airspace. The GOF 2.0 project is one of several projects managed by the SESAR Joint Undertaking that are dedicated to U-space, the European Commission's initiative for the safe and secure integration of drones into the airspace.

This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017689.

About SESAR

As the technological pillar of the Single European Sky initiative, SESAR aims to modernise and harmonise air traffic management in Europe. The SESAR Joint Undertaking (SESAR JU) was established in 2007 as a public-private partnership to support this endeavour. It does so by pooling the knowledge and resources of the entire ATM community in order to define, research, develop and validate innovative technological and operational solutions. The SESAR JU is also responsible for the execution of the European ATM Master Plan which defines the EU priorities for R&D and implementation. Founded by the European Union and Eurocontrol, the SESAR JU has 19 members, who together with their partners and affiliate associations will represent over 100 companies working in Europe and beyond. The SESAR JU also works closely with staff associations, regulators, airport operators and the scientific community.

About EANS (Estonian Air Navigation Services)

Estonian Air Navigation Services (EANS, Lennuliiklusteeninduse Aktsiaselts) is a next generation air navigation services provider, headquartered in Tallinn, Estonia. We provide safe and efficient air navigation services together with air traffic management consultation and training services. We are well integrated into international air navigation services community and shaping the future of air traffic management within European Union. Coming from one of the worlds most advanced digital societies, gives us the strength, knowledge, and expertise to make the digital transformations in air navigation industry real. Together with our 200 employees we are designing innovative and sustainable integrated airspace, via dynamic cross-border FINEST collaboration with our neighbours in Finland. We are one of the drivers of the safe airspace integration of unmanned aerial vehicles within the Single European Sky Initiative Gulf of Finland (GOF) 2.0 and developing unified air traffic management in Estonia. Our remote tower technology is one of a kind and enables us to control air traffic at several aerodromes simultaneously from one working position, ensuring high quality and safe services even in poor weather visibility conditions. EANS is a state-owned public limited company under the jurisdiction Ministry of Economic Affairs and Communication of Republic of Estonia.

About CAFA Tech

CAFA (Center of Automated Flights Applications) develops 3D maps for automated drone flights. CAFA 3D maps visualize drone flights in the true 3D environment. CAFA has developed a Tallinn 3D Map and its web application for drone operations (https://cafa3d.com/3dpoc). CAFA 3D map has also Google Earth 3D cities integration for planning low altitude drone operations in Europe and in USA. 3D Map is essential part of safe and efficient drone route and flight corridor planning.

About Dimetor

Dimetor is a software company bridging the data gap between communications service providers (CSPs) and the aviation eco-systems. Through its world-leading platform AirborneRF, they help provide supplementary data that is critical for safe BVLOS drone operations. AirborneRF focuses on (a) the 3D corridors in space that have sufficiently good connectivity for drone operations (e.g. for networked remote ID, command and control, payload communication), and (b) the population density for ground risk assessment, based on anonymized cellular mobility data. Developed by experts in mobile communication networks, aviation and drone technology, AirborneRF also provides live notifications from the CSP networks in case of any issue during flight operation may occur. Dimetor's software has been deployed worldwide, including Australia, Switzerland, Netherlands, the United States. Visit www.dimetor.com and www.airborneRF.com for more information.

About Droneradar

Droneradar Sp. z o.o. (www.droneradar.eu) is a technology provider for PansaUTM. Droneradar developed mobile application, supporting building full aeronautical awareness across Drone community, two-way non-verbal communication (CDDLC – Controller Drone Data Link Communication) and also unique algorithm for judging possibility of the flight. Droneradar is daughter company of dlapilota.pl Sp. z o.o. Polish General Aviation portal and aeronautical data publisher, established in 2002. Currently, Dronereadar activities are focused on autonomous flights, automation of processes between UTM and ATM world, CIS interfaces standardization. Droneradar is active on European and National legislation level supporting many standardization organizations.

About EHang

EHang (Nasdaq: EH) is the world's leading autonomous aerial vehicle (AAV) technology platform company. Our mission is to make safe, autonomous, and eco-friendly air mobility accessible to everyone. EHang provides customers in various industries with AAV products and commercial solutions: air mobility (including passenger transportation and logistics), smart city management, and aerial media solutions. As the forerunner of cutting-edge AAV technologies and commercial solutions in the global Urban Air Mobility (UAM) industry, EHang continues to explore the boundaries of the sky to make flying technologies benefit our life in smart cities. For more information, please visit www.ehang.com.

About Fintraffic ANS

Fintraffic ANS is responsible for managing the use of Finnish airspace as well as providing air traffic control services at airports in Finland. En-route services include area control services in Finland, airspace management, aeronautical search and rescue and air traffic flow management. Our technological air navigation services maintain and develops all navigation, communication, surveillance and monitoring systems related to en-route services, such as the air traffic control and radar systems required for flight surveillance. Our customers include airports, the commercial aviation industry, the Finnish state's aviation operations and military aviation, general aviation and pilot training schools.

About FREQUENTIS

Frequentis, headquartered in Vienna, is an international supplier of communication and information systems for control centres with safety-critical tasks. Such 'control centre solutions' are developed and marketed by Frequentis in the business sectors Air Traffic Management (civil and military air traffic control, air defence) and Public Safety & Transport (police, fire brigade, ambulance services, shipping, railways). As a global player, Frequentis operates a worldwide network of branches, subsidiaries and local representatives in more than 50 countries.

Products and solutions from Frequentis can be found in over 35,000 operator working positions and in approximately 140 countries. Founded in 1947, Frequentis considers itself to be the global market leader in voice communication systems for air traffic control with a market share of around 30%. In addition, the Frequentis Group's AIM (aeronautical information management) and AMHS (aeronautical message handling) systems, as well as GSM-R systems for Public Transport are industry leading global solutions.

The shares of Frequentis AG are traded on the Vienna and Frankfurt Stock Exchange under the ticker symbol FQT (ISIN: ATFREQUENT09). In 2019, the Frequentis Group had about 1,850 employees worldwide and generated revenues of EUR 303.6 million and EBIT of EUR 17.2 million. For more information, please visit www.frequentis.com

About IBCh PAS PSNC

Poznan Supercomputing and Networking Center (PSNC) affiliated to the Institute of Bioorganic Chemistry of the Polish Academy of Sciences is an internationally known node of the European Research Area in the field of IT infrastructure of science and an important R&D center in the field of information and communication technologies (ICT). As a development centre of e-Infrastructure, PSNC designed and built the Metropolitan Network POZMAN, High Performance Computing Center and the national broadband network PIONIER, maintained and still developed by PSNC.

PSNC is an important element of global research and development base, implementing projects mainly under the European Union Framework Programmes, but also supporting R&D initiatives with more than a thousand partners from around the world. PSNC has participated and participates in 215 such projects, coordinating 20 of them. For over a quarter century of its activity 282 research and structural projects have already been implemented in the Centre (coordinating as many as 38 of them), which is one-seventh of all PSNC projects.

PSNC has been operating with a mission: “Integration and development of information infrastructure for science”. The potential of the infrastructure and the several dedicated laboratories, including a fleet of unmanned aerial vehicles, are the basis of innovative applications in agriculture, logistics or education. The possibilities are being expanded with the new experimental and laboratory space at the airport in Kąkolewo with dedicated data collection and processing services and a connection to the PIONIER network infrastructure.

About Polish Air Navigation Services Agency (PANSA)

Every day Polish Air Navigation Services Agency ensures safety of passengers in more than 3,000 flights over Poland. We have one of the biggest airspace in Europe: over 334,000 km2. Before coronavirus pandemic almost a million overflights, approaches, take-offs and landings in 2019 were supervised by almost 600 air traffic controllers employed in Polish Air Navigation Services Agency, as well as around 260,000 General Aviation flights under watch of the Flight Information Service (FIS). Polish Air Navigation Services Agency is also the only institution in Poland training and employing civil air traffic controllers (ATCOs). We also provide Flight Inspection Services for monitoring the proper operation of ground-based navigation aids from the air. Our air traffic controllers are supported by advanced technology. Over 200 devices located throughout Poland guaranteeing safety of air traffic within the Polish airspace: air-ground communication systems, RNAV systems, ILS – DME systems supporting smooth and precise landing in low visibility, radars. PANSA also builds and develops tools for efficient management and planning of airspace: CAT (Common Airspace Tool) – that ensures accurate and efficient management of the airspace, PANDORA – that supports controllers and other operations personnel with the wide spectrum of a real time aviation data, raising their situational awareness, PANSA UTM – system for UAV flight coordination, TRAFFIC – Track Advisor for Flight Information Concerns, which provides the ATM system information from flight plans, as amended and complementary messages.

PANSA have developed and implemented PansaUTM – UAV flight coordination system. In March 2020 PansaUTM became the first operational system in Europe which involves Air Traffic Controllers with fully working collaborative ATC interface supporting two-way non verbal communication with UAS pilots. The system is operationally working on all 15 civil TWRs and all 5 FIS sectors. According to the statistics the number of all operations in 2020 reached more almost 300 000 UAV flights submitted to the PansaUTM including all controlled zones in Poland. Comparing it to the number of manned aircraft operations in uncontrolled airspace in 2019 (240 000) recorded by PANSA – shows that number of unmanned operations already surpassed that number. In February 2021 PANSA have implemented new version of PansaUTM 1.2 with additional functionalities for UAS pilots and air traffic controllers including automatic approvals.

About Robots.Expert

Robots Expert Finland Oy (REX) is a European expert and consultancy company focused on Unmanned Aviation with a mission to Create a Future where Drones benefit both Business and Society. REX helps organizations to exploit new drone technology in their business; consults on the value-chain and change management needed to adopt drones into workflows, helps organizations comply with safety regulations, and facilitates flying demonstrations to prove the true benefits in business. REX' personnel have a strong background in UAS, technology and strategy, as well as in Urban Air Mobility and project management to support the tasks of facilitating demonstrations and to manage large projects or consortia.

About Threod Systems

Threod Systems specializes in developing, producing, and operating Unmanned Aircraft Systems (UAS) that are designed for information collection and exploitation in wide range of applications. Threod supports the decision-making process on every level of command. Threod Systems is known for rapid product development and tailor made UAS solutions for small multirotors, fixed-wing UAV platforms, and in-house developed subsystems. Threod System designs, develops, manufactures and operates Unmanned Aircraft Systems and subsystems for information collection, surveillance and other tasks related to unmanned sensing including VLOS and BVLOS operations.

About Unmanned Systems Limited

Unmanned Life is a multi-award-winning deep tech company. Our core IP is the world's first 5G, Edge and AI-enabled software platform which can deploy and manage at scale, integrated swarms of different types of robotic devices (UAV, AGV etc.) of varied capabilities, working together autonomously to deliver commercial grade solutions for the Industry 4.0 and Smart Cities market sectors. Our Mission is to become the Go-To Software Platform for Seamless Orchestration of Autonomous Robotics

We are comprised of a small but highly talented team (punching well above our weight) of multiple nationalities, educated at the world's top schools in their respective disciplines with experience in frontier and emerging technologies such as 5G, Cloud Computing, AI, Robotics, Autonomy as well as Business Leadership, Management and Sales in some of the world's leading companies. We have been recognized across the world by various technology giants, fortune 500 industrial behemoths, governments and associations winning awards such as "Most Innovative Company" by Alibaba Group (2019), "Most Innovative Technology" by NTT Group (2019) and the UK National Technology Award (2018).

Finally, we have existing projects, pilots, and strategic partnerships with industry behemoths in technology, telco, logistics and government such as Telefonica, SEAT, Walmart, BT, Etisalat, Dubai Future Foundation and the City of Vienna to name a few. Our diverse and immensely motivated team unites on our mission to become the go to software platform for seamless orchestration of heterogeneous robotic swarms. To find out more visit: https://unmanned.life/

About Vaisala Oyj

Vaisala is a global leader in weather, environmental, and industrial measurements. Building on over 80 years of experience, Vaisala provides observations for a better world, with space-proof technology even exploring Mars and beyond. We are a reliable partner for customers around the world, offering a comprehensive range of innovative observation and measurement products and services. Headquartered in Finland, Vaisala employs approximately 1,900 professionals worldwide and is listed on the Nasdaq Helsinki stock exchange.

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